

## **REMARKS**

The amendments and remarks herein attend to all outstanding issues in the pending non-final Office Action of October 7, 2003. Claims 1-6, 9, 11-23, 26 and 28-54 remain pending in this application. Claims 1-3, 6, 11-14, 18-20, 28-31, 35-38, 40-43, 45-48 and 50-53 are amended. Claim 7 is cancelled. The Specification is amended for editorial clarity. No new matter is added with any of the amendments presented herein.

### **I. Priority**

The status of related applications has been updated, application serial numbers have been added for the listed issued patents, and wording has been amended to clarify that the present application (and not 08/881,968) is a CIP of 09/419,127. No new matter has been entered.

### **II. Information Disclosure Statement**

Applicants acknowledge that the Examiner is unable to consider references missing publication dates or pages. Regretfully, with the exception of the Merck Manual citation (addressed below), the copies submitted in the Information Disclosure Statement represent the best copies available to Applicant. Applicant is therefore unable to provide the information required for proper consideration.

In accordance with the Examiner's request for page numbers of the Merck Index reference, Applicant submits herewith a Replacement Sheet to the Information Disclosure Statement filed 10/30/2001, and a Replacement Sheet to the Merck manual reference also submitted 10/30/2001. Both Replacement Sheets properly identify pages 1216-1217 of the Merck Manual.

### **III. Specification**

The Merck Index citation was objected to by the Examiner as introducing new matter. The citation has been removed.

### **IV. Objections to the Claims**

All of the Examiner's suggestions regarding changes to the claims have been implemented. The changes were deemed to be semantic in nature and not limiting. No new matter has been entered in the claims.

- The formulas, both structural and written, were corrected in claims 1, 11, 18 and 28.
- The spelling of alkynyl was corrected in claims 1 and 18.
- The "0"s have been replaced with "O"s in the phosphate salts of claims 1, 11, 18 and 28.
- The term "fungicidal" has been changed to "fungal" in claims 1, 18, 35, 40, 45 and 50.
- The term "salt" has been removed from claims 11, 12, 13, 14 and 18.
- The term "bactericidal" has been changed to "bacterial" in claims 35, 40, 45 and 50.
- The abbreviation AI (active ingredient) was changed to "metal" in claims 2, 3, 19, 20, 38, 43, 48 and 53.
- The lettering of the sub-sections of claims 35, 40, 45 and 50 has been corrected.
- Punctuation has been added at the ends of claims 36, 41, 46 and 51.

In addition to the above amendments, Applicant has further amended the claims for editorial clarity, as follows:

- Tin has been removed from the list of metals in claims 1, 18, 35, 40, 45 and 50.
- The word "has" has been deleted from claim 18.
- Grammar has been corrected in claims 36, 41, 46 and 51.

**V. Claim Rejections under 35 U.S.C. §112, first paragraph**

Claims 1-6, 9, 11-17, 32 and 33 stand rejected under 35 U.S.C. §112, first paragraph. The Examiner stated that, "the specification, while being enabling for controlling, does not reasonably provide enablement for preventing." Applicant respectfully disagrees with the Examiner's conclusion that prevention is not enabled.

The Merriam-Webster dictionary defines the word prevent in the following manner: "to meet or satisfy in advance; to act ahead of; to keep from happening or existing; to deal with beforehand. Prevent implies taking advance measures against something possible or probable." Therefore, Applicant contends that it would be obvious to one of ordinary skill in the agricultural arts to apply the disclosed composition to an unafflicted plant, thereby "acting ahead of" the fungus, bacteria or microorganism to keep such fungus, bacteria or microorganism from existing on the plant.

The patent application further discloses a minimal formula for a preventative composition, [0024]:

**"The preferred composition for preventing Phytophthora will be comprised of at least one potassium phosphonate and at least one potassium phosphate, as it has been found that these two constituents, when combined, will cause a synergistic effect which results in the substantial prevention of infection by Phytophthora...The two constituents will be combined in an amount sufficient to prevent infection and manifestation by various disease causing organisms, with the particular amounts combined dependent upon the particular species of plant to be treated, the specific disease causing organism to be treated, and the particular phosphate salt and phosphonate salt that will be combined."**  
(emphasis added)

In addition to the formula of a preventative composition (*i.e.*, at least one phosphonate and at least one phosphate), preventative compositions are defined as dry mixes or aqueous solutions [0023] which may be applied by various means: spraying [0032]; foliar application, either by ground or aerial equipment [0038]; or injection or soil applications [0038].

Applicant further submits that there is no requirement that a working example be disclosed in order to enable one of ordinary skill in the art to practice the invention. However, Examples 3, 5, 6, 7 and 8 are all directed to plant material exposed to fungicides or bactericides prior to inoculation or exposure to adverse organisms.

In summary, the application discloses the use of the invention in a preventative sense, a minimal formula for prevention (*i.e.*, at least one phosphonate

and at least one phosphate) and means for administering the preventative composition to plants. It is only left for an ordinary person to know to apply the preventative composition to plants prior to infection. Given that the definition of prevent is "to keep from happening or existing; to deal with beforehand; taking advance measures against something possible or probable," *and* that there are 5 examples of fungicides or bactericides being applied to unafflicted plants in the application, the use of the invention in a preventative sense is clearly enabled.

The preceding discussion demonstrates that the applicant was in intellectual possession of an embodiment using the disclosed composition for preventing fungus, bacteria and microorganisms. Furthermore, no undo experimentation would be necessary for one of ordinary skill in the art to practice this embodiment. For example, sample 7 of Example 13 discloses a composition containing at least one phosphonate and at least one phosphate that would be appropriate for preventative use.

**VI. Claim Rejections under 35 U.S.C. §112, second paragraph**

Claims 6, 18, 23, 28-31, 35-38, 40, 41-43, 45-48 and 50-53 stand rejected under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Appropriate correction has been made as follows:

- The recitation of "added as an aqueous solution containing an amount of metal chelate (on a metal basis)" in claims 6 and 23 has been changed to "added in an amount (on a metal basis)". As only one "aqueous solution" is now recited, it is clear that the metal chelate is added on a weight basis relative to the entire solution. Support for this amendment may be found at [0031] which states, "...adding the metal chelate to the water in an amount equal to between about 1% and about 5% by weight (on a metal basis) **of the total solution.**"
- The term "salt" has been removed from claims 11, 12, 13, 14 and 18.

- The terms "first salt" and "second salt" have been changed to "phosphonate salt" and "phosphate", respectively, in claims 28, 29, 30 and 31.
- The word "composition" has been added to claims 35, 38, 40, 43, 48, 50 and 53.
- Potassium phosphate has been changed to "dipotassium" phosphate in claims 36, 37, 41, 42, 46, 47, 51 and 52.
- Phrases directed to the equilibrium reactions and products have been added to claims 35, 40, 45 and 50.

No new matter has been added to the claims by these amendments.

## **VII. Double Patenting**

Claims 1-6, 9, 11-23, 26 and 28-54 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 5,736,164, Claims 1-5 of U.S. Patent No. 5,800,837 or Claims 1-49 of U.S. Patent No. 6,338,860, each in view of Ducret et al. (U.S. Patent No. 4,139,616), Fenn et al (1984), Reuveni et al. (Plant Pathology 1995), Scher (U.S. Patent No. 4,714,614) and Supa Crop.

Additionally, Claims 1-6, 9, 11-23, 26 and 28-54 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 6,139,879 in view of Ducret et al. (U.S. Patent No. 4,139,616), Fenn et al (1984), Reuveni et al. (Plant Pathology 1995), Scher (U.S. Patent No. 4,714,614) and Supa Crop (1990).

Of the above listed references, only Scher and Supa Crop relate to metal chelates. Scher teaches that FeEDDHA is effective against Fusarium wilt. Supa Crop teaches a composition containing phosphates, phosphonates, and metal chelates of iron, manganese, zinc, and copper, wherein the metal chelates provide nutrients to plants. The Examiner has cited *In re Kerkhoven*, 205 USPQ 1069, 1072 (CCPA 1980) which states, "It is prima facie obvious to combine two compositions each of which is **taught by the prior art to be useful for the same purpose**, in order to form a third composition to be used for the very same purpose." However, Supa Crop

teaches that metal chelates act as nutritional supplements when mixed with a phosphate and a phosphite, whereas Scher teaches fungicidal activity of FeEDDHA combined with a disease-suppressant strain of *Pseudomonas putida*. The two references are not teaching the use of metal chelates for the same purpose. Therefore, the combination of these references does not create a case of *prima facie* obviousness. As none of the other references cited by the Examiner teach metal chelates, they also do not support a case for *prima facie* obviousness-type double patenting.

In addition, as discussed in the next section, there is a synergistic effect based on the combination of Applicant's three-component mixture. This was previously presented to the Examiner. With all due respect, Applicant submits that the Examiner has misinterpreted the supplied information.

#### **VIII. Claim Rejections under 35 U.S.C. §103(a)**

Claims 1-6, 9, 11-23, 26 and 28-54 stand rejected under 35 U.S.C. §103(a) as unpatentable over Horriere et al. in view of Ducret et al. (U.S. Patent No. 4,139,616), Fenn et al. (1984), Reuveni et al. (Plant Pathology 1995), Scher (U.S. Patent No. 4,714,614) and Supa Crop (1990).

Applicants repeats and incorporates the arguments set forth in the preceding section. Without more, the pending application claims are in condition for allowance. The fact that the three-component mixture of the invention displays a synergistic effect leaves no room for doubt on this score.

A synergistic effect based on the combination of Applicant's three component mixture was previously presented. In response to these arguments, the Examiner has stated, "In an IPER (12/13/2002), it was remarked by the PCT examiner that the embodiments of the claimed invention showed no synergistic activity but only what would be expected from the combination of the components."

The PCT examiner cited Colby, S. R. "Calculation of the Synergistic and Antagonistic Responses of Herbicide Combinations," *Weeds*, 1967, 15, 20-22, containing the formula:

$$E = X + Y - XY/100$$

in which E represents the expected percentage of inhibition of the disease for the combination of the two fungicides at defined doses (for example equal to x and y respectively), X is the percentage of inhibition observed for the disease by the compound (I) at a defined dose (equal to x), Y is the percentage of inhibition observed for the disease by the compound (II) at a defined dose (equal to y). **When the percentage of inhibition observed for the combination is greater than E, there is a synergistic effect.** The PCT Examiner then incorrectly states, "this is the case neither in Exhibit A, nor in Exhibit B, wherein the percentage of inhibition in both cases equals to E (more or less 1-2%)." A comparison of expected results (calculated with the above formula) versus observed results for Exhibits A and B are shown below:

Exhibit A – Late Blight Observations on Potato var. "Atlantic"

Treatment	% Late Blight
<b>Sample 1.</b> 15.1% K <sub>2</sub> HPO <sub>3</sub> + 15.1% K <sub>2</sub> HPO <sub>4</sub> + 69.8% inert ingredients (H <sub>2</sub> O)	1.85
<b>Sample 2.</b> Cu-EDDHA (3.2% Cu) – 0.2 lb. AI/100 gal.	18.45
<b>Sample 7.</b> 80% v/v Sample 1 + 0.2 lb. AI/100 gal. (Cu-EDDHA)	0.39
<b>Control</b>	28.12

E = (28.12-1.85)+(28.12-18.45)-((28.12-1.85)\*(28.12-18.45))/100 = 33.4% inhibition expected (i.e., 33.4-28.12 = **5.28% late blight expected**)  
**0.39% late blight observed**  
**Improvement of 4.89%**

Exhibit B – Carrot Alternaria Trial

Treatment	% Infected
<b>Sample 1.</b> 15.1% K <sub>2</sub> HPO <sub>3</sub> + 15.1% K <sub>2</sub> HPO <sub>4</sub> + 69.8% inert ingredients (H <sub>2</sub> O)	26.25
<b>Sample 2.</b> Cu-EDDHA (3.2% Cu) – 0.2 lb. AI/100 gal.	28.75
<b>Sample 7.</b> 80% v/v Sample 1 + 0.2 lb. AI/100 gal. (Cu-EDDHA)	15.0
<b>Control</b>	52.5

$E = (52.5-26.25)+(52.5-28.75)-((52.5-26.25)*(52.5-28.75))/100 = 36.14\%$  inhibition expected (i.e.,  $52.5 - 36.14 = 16.36\%$  infection expected)

**15.0% infection observed**

**Improvement of 1.36%**

Additionally, data based on an affidavit submitted in the present application on July 3, 2003 is shown below:

Cauliflower seedlings subjected to *Zanthomonas campestris* pv. *campestris*

Treatment	% Infected
<b>FNX-100.</b> (PO <sub>3</sub> /PO <sub>4</sub> ) @ 2% v/v (H <sub>2</sub> O)	21.0
<b>FNX-200.</b> Cu-EDDHA @ 0.2 lb. AI/100 gal.	34.7
<b>FNX-2000.</b> FNX-100@2% + FNX-200 0.2 lb. AI/100 gal. (Cu-EDDHA)	1.39
<b>Control</b>	59.3

$E = (59.3-21.0)+(59.3-34.7)-((59.3-21.0)*(59.3-34.7))/100 = 53.48\%$  inhibition expected (i.e.,  $59.3 - 53.48 = 5.82\%$  infection expected)

**1.39% infection observed**

**Improvement of 4.43%**

Each of the three examples above shows greater than expected inhibition of disease and, thus, a synergistic effect. The court has stated, “A greater than expected result is an evidentiary factor pertinent to the legal conclusion of obviousness...of the claims at issue.” In *re Corkill*, 711 F.2d 1496, 226 USPQ 1005 (Fed. Cir. 1985).



Improvements in pesticide effectiveness, such as those demonstrated above, are not insignificant. World pesticide expenditures totaled more than \$33.5 billion dollars in 1998 and 1999, with U.S. expenditures making up approximately \$11 billion dollars of total expenditures.<sup>1</sup> Therefore, improvements in pesticide efficiency of 1-5% translate into savings of billions of dollars.

<sup>1</sup> "Pesticides Industry Sales and Usage: 1998 and 1999 Market Estimates" issued by the United States Environmental Protection Agency in August 2002, accessed January 27, 2004 on the internet at: [www.epa.gov/opppbead1/pestsales/99pestsales/market\\_estimates1999.pdf](http://www.epa.gov/opppbead1/pestsales/99pestsales/market_estimates1999.pdf).

### **VIII. Conclusion**

Applicant submits that the present paper is a complete response to the non-final Office Action of October 7, 2003 that should put this application in condition for allowance. Should the Examiner have any questions, comments or suggestions that would expedite the prosecution of this case, Applicants' undersigned representative earnestly requests a telephone conference.

Respectfully Submitted,

Date: April 7 2004



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USE: In analytical chemistry.

7636. **Potassium Nitroprusside**. *Dipotassium pentakis-(cyanochloro)ferate(2-)*; *potassium nitrosylpentacyanoferrate(II)*.  $C_5FeK_2N_6O$ ; mol wt 294.14. C 20.42%, Fe 18.99%, K 26.58%, N 28.57%, O 5.44%.  $K_2Fe(CN)_5(NO)$ . Dihydrate, garnet-red, hygroscopic crystals. Sol in 1 part water, in alcohol. *Keep well closed.*

7637. **Potassium Oleate**. *Oleic acid potassium salt*. Approx  $C_{18}H_{33}KO_2$ . Yellowish or brownish, soft mass. Sol in water, alc. The aq soln is alkaline to phenolphthalein.

USE: Detergent.

7638. **Potassium Osmate(VI)**.  $K_2O_5Os$ ; mol wt 332.40. K 23.53%, O 19.25%, Os 57.22%.  $K_2OsO_6$ . Dihydrate, violet, hygroscopic crystals. *Poisonous!* Sol in water, insol in alcohol, ether. Slowly dec in aq solns with formation of the tetroxide. *Keep well closed.*

7639. **Potassium Oxalate**.  $C_2K_2O_4$ ; mol wt 166.22. C 14.45%, K 47.05%, O 38.50%.  $K_2C_2O_4$ . Monohydrate, colorless, odorless crystals; efflorescent in warm dry air. *Poisonous!* d 2.13. Loses its water at about 160°; when ignited is converted into carbonate without appreciable charring. Sol in 3 parts water.

USE: Cleaning and bleaching straw, removing stains in photography; in examination of blood to prevent its coagulation; also in analytical chemistry.

7640. **Potassium Percarbonate**.  $C_2K_2O_6$ ; mol wt 198.22. C 12.12%, K 39.45%, O 48.43%.  $K_2C_2O_6$ . Prepa of practically anhydrous compd: Partington, *Fatallah, J. Chem. Soc.* 1950, 1934.

Monohydrate, white, granular mass. Sol in water with evolution of oxygen. One part potassium percarbonate is sol in 15 parts of cold water; dec in boiling water; 100 parts water dissolve 6.5 parts potassium percarbonate at ordinary temp. *Keep dry and protected from light.*

USE: Has been used in microscopy for detecting tubercle bacilli stained with fuchsin in smears; in photography under the name *Anti-hypo*, to remove last traces of sodium thiosulfate; also as oxidizing agent in chem analyses, but is no longer favored. *Caution:* Strong irritant. Causes vomiting if swallowed. Large quantities can be fatal.

7641. **Potassium Perchlorate**. *Periodin*; *Perchloracap*.  $KClO_4$ ; mol wt 138.55. Cl 25.59%, K 28.22%, O 46.19%.  $KClO_4$ .

Colorless crystals or white, crystalline powder. Dec at 400°; also dec by organic matter, oxidizing substances and on concussion, but is less reactive than the chlorate. d 2.52. Sol in 65 parts cold water, 15 parts boiling water; practically insol in alcohol.

USE: In explosives, pyrotechnics and photography, in analytical chemistry.

7642. **Potassium Periodate**. *Potassium metaperiodate*.  $KIO_4$ ; mol wt 230.01. I 55.18%, K 17.00%, O 27.82%.  $KIO_4$ . Prepa by oxidizing potassium iodate with chlorine in alkaline soln: Hill, *J. Am. Chem. Soc.* 50, 2678 (1928); *Inorg. Syn.* 1, 171 (1939).

Colorless tetragonal crystals, d<sub>4</sub><sup>25</sup> 3.618. mp 582°. Sol in water (g/100 g H<sub>2</sub>O): 0.168 at 0°; 0.42 at 20°; 0.93 at 40°; 2.16 at 60°; 4.44 at 80°; 7.87 at 100°; also given as 0.66 at 13°. Sparingly sol in aq KOH.

USE: Powerful oxidizer in acid soln, oxidizing manganese compds to permanganate; used for this purpose in analytical chemistry (colorimetric estimation of Mn), also for the oxidation of some organic compds. *Caution:* Highly irritating to skin, eyes, mucous membranes.

7643. **Potassium Permanganate**. *Permanganic acid potassium salt*; *chameleon mineral*.  $KMnO_4$ ; mol wt 158.03. K 24.74%, Mn 34.76%, O 40.50%. Prepa from manganese ore by electrolytic oxidation: Faith, Keyes & Clark's *Industrial Chemicals*, F. A. Lowenheim, M. K. Moran, Eds. (Wiley-Interscience, New York, 4th ed., 1975) pp 679-683.

Dark purple or bronze-like, odorless crystals. Almost opaque by transmitted light and of a blue metallic luster by reflected light. Sweet with astringent aftertaste; stable in air.

Dec about 240° with evolution of oxygen. d 2.1. Soluble in many other organic solvents, also by concd acids with liberation of oxygen; with HCl, chlorine is liberated. Readily dec by many reducing substances, such as ferrous salts, iodides, oxalates, etc., especially in the presence of an acid. *Caution:* Take great care in handling as explosions may occur if brought into contact with organic or other readily oxidizing substances, either in soln or in the dry state. LD<sub>50</sub> male rats: 1.09 g/kg. H. F. Smyth *et al.*, *Am. Ind. Hyg. Assoc.* 30, 470 (1969).

*Incompat:* Alcohol, arsenites, bromides, iodides, hydriochloric acid, charcoal; organic phosphites generally, ferrous or mercurous salts, hypophosphites, hyposulfites, sulfites, peroxides, oxalates.

*Human Toxicity:* Dilute solns are mildly irritating; high concns are caustic.

USE: Bleaching resins, waxes, fats, oils, straw, cotton, and other fibers and chamois skins; dyeing wood barks, printing fabrics; washing CO<sub>2</sub> in manuf mineral waters; terminating *Odium tuckeri*; photography; tanning leather; purifying water, with formaldehyde soln to expel formaldehyde gas for disinfecting; as an important reagent in analytical and synthetic organic chemistry.

THERAP CAT: Topical antiseptic, astringent, detergent.

7644. **Potassium Persulfate**.  $K_2O_8S_2$ ; mol wt 270. K 28.93%, O 47.35%, S 23.72%.  $K_2S_2O_8$ . The article commerce contains 93-97%  $K_2S_2O_8$ .

Colorless or white, odorless crystals. Gradually dec with available oxygen; dec more quickly at higher temp. Completely dec ~100°. A powerful oxidizing agent. Sol about 50 parts water, 25 parts water at 40°; insol in alc. The aq soln dec at ordinary temp and more rapidly on warming. USE: Bleaching fabrics, soaps; in photography under the name *Anthon* to remove last traces of thiosulfate in plates and paper; in analytical chemistry.

7645. **Potassium Phenolsulfonate**. *Hydroxybenzenesulfonic acid potassium salt*; *potassium sulfocarbonate*.  $C_6H_5KO_3S$ ; mol wt 212.26. C 33.95%, H 2.37%, K 18.47%, S 15.10%.  $C_6H_5(OH)SO_3K$ . Monohydrate, white, odorless crystals, d 1.87. Sol in water, alcohol. The aq soln is practically neutral to litmus.

7646. **Potassium Phenoxide**. *Phenol potassium salt*; *potassium phenate*; *potassium phenylate*; *potassium carbide*.  $C_6H_5KO$ ; mol wt 122.20. C 54.51%, H 3.81%, K 29.59%, O 12.10%.  $C_6H_5OK$ . Prepa from phenol and KOH in methanol: Kornblum, Lurie, *J. Am. Chem. Soc.* 81 (1959).

White to reddish, hygroscopic, crystalline. Very soluble in water, sol in alcohol. The aq soln is strongly alkaline; tightly closed.

7647. **Potassium Phosphate, Dibasic**. *Dipotassium phosphate*; *dipotassium phosphate*; *DKP*; *dipotassium hydrogen phosphate*.  $HK_2O_4P$ ; mol wt 174.18. H 0.58%, K 44.89%, O 36.74%, P 17.79%.  $K_2HPO_4$ .

White, somewhat hygroscopic granules. Very sol in slightly in alcohol. 100 g will dissolve rapidly and completely in 67 g of cold water. Converted into pyrophosphate on ignition. The aq soln is slightly alkaline to phenolphthalein. *Keep well closed.*

USE: Buffering agent in antifreeze solns; nutrient culture of antibiotics; ingredient of instant fertilizers; sequestrant in the prep of non-dairy powdered creams.

THERAP CAT: Cathartic.

7648. **Potassium Phosphate, Monobasic**. *Potassium phosphate*; *potassium acid phosphate*; *potassium dihydrogen phosphate*; *monopotassium phosphate*; *Sörensen's phosphate*.  $H_2K_2O_4P$ ; mol wt 136.09. H 1.17%, K 28.73%, O 47.03%, P 22.76%.  $KH_2PO_4$ .

Colorless crystals or white, granular powder; per in air; at 400° loses H<sub>2</sub>O, forming metaphosphate. Sol in air; at about 4.5 parts water. Insol in alcohol. pH

Dec about 240° with evolution of oxygen. d 2.1. Soluble in many other organic solvents, also by concd acids with liberation of oxygen; with HCl, chlorine is liberated. Readily dec by many reducing substances, such as ferrous salts, iodides, oxalates, etc., especially in the presence of an acid. *Caution:* Take great care in handling as explosions may occur if brought into contact with organic or other readily oxidizing substances, either in soln or in the dry state. LD<sub>50</sub> male rats: 1.09 g/kg. H. F. Smyth *et al.*, *Am. Ind. Hyg. Assoc.* 30, 470 (1969).

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Colorless or white, odorless crystals. Gradually dec with available oxygen; dec more quickly at higher temp. Completely dec ~100°. A powerful oxidizing agent. Sol about 50 parts water, 25 parts water at 40°; insol in alc. The aq soln dec at ordinary temp and more rapidly on warming. USE: Bleaching fabrics, soaps; in photography under the name *Anthon* to remove last traces of thiosulfate in plates and paper; in analytical chemistry.

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Colorless crystals or white, granular powder; per in air; at 400° loses H<sub>2</sub>O, forming metaphosphate. Sol in air; at about 4.5 parts water. Insol in alcohol. pH

7649. **Potassium Phosphate, Tribasic**. *Tripotassium phosphate*.  $K_3O_4P$ ; mol wt 212.27. K 55.25%, O 30.15%, P 14.59%.  $K_3PO_4$ . Purification: Jänecke, *Z. Physik. Chem.* 17, 15 (1927); Simon, Schulze, *Z. Anorg. Allgem. Chem.* 241, 331 (1939).

Dibasic, colorless, orthorhombic crystals. d<sub>4</sub><sup>25</sup> 2.564. mp 1460°. Sol in water: 43.7% at 0°; 50.8% at 25°; 59.7% at 45°. Insol in alcohol. Aq solns are strongly alkaline. Octahydrate, flat, rectangular platelets, mp 45.1°.

7650. **Potassium Phosphite**.  $HK_2O_3P$ ; mol wt 158.18. H 0.64%, K 49.43%, O 30.34%, P 19.59%.  $K_2HPO_3$ . White, deliquescent powder. Slowly oxidizes in the air to phosphate; dec by heat. Very sol in water; insol in alcohol. *Keep well closed.*

7651. **Potassium Picrate**. 2,4,6-Trinitrophenol potassium salt; *potassium trinitrophenolate*.  $C_6H_3K_2NO_6$ ; mol wt 367.20. C 26.97%, H 0.75%, N 15.73%, O 41.92%. K 14.63%. Yellow, reddish or greenish, lustrous needles. *Explosives when struck or heated*. Sol in 200 parts cold water, 4 parts boiling water.

7652. **Potassium Pyroantimonate**. *Acid*. *Potassium antimonate(V)*. Approx  $K_3H_5Sb_3O_{14}$ . White granules or crystalline powder. Moderately sol in cold water; insol in alcohol.

USE: Formerly used for detection of sodium.

7653. **Potassium Pyrophosphate**. *Diphosphoric acid tetrapotassium salt*.  $K_4O_7P_2$ ; mol wt 330.34. K 47.35%, O 33.97%, P 18.75%.  $K_2P_2O_7$ . Manuf: Faith, Keyes & Clark's *Industrial Chemicals*, F. A. Lowenheim, M. K. Moran, Eds. Wiley-Interscience, New York, 4th ed., 1975) pp 684-687.

White, colorless, deliquescent granules or crystalline mass; very sol in water, insol in alcohol. The aq soln is alkaline. USE: In detergents and surfactants; in water treatment; in filling muds as a clay thicken.

7654. **Potassium Pyrosulfate**. *Disulfuric acid dipotassium salt*; *anhydrous*.  $K_2O_7S_2$ ; mol wt 340.14. K 30.75%, O 44.04%, S 25.22%.  $K_2S_2O_7$ . Sol in water. The aq soln is strongly acid.

7655. **Potassium Salicylate**.  $C_7H_5KO_3$ ; mol wt 176.21. C 50.71%, H 2.86%, K 22.19%, O 26.43%.  $HOC_6H_4COOK$ . White, odorless powder. Becomes pink on exposure to air. Very sol in water, alcohol. One gram dissolves in 0.85 g H<sub>2</sub>O. A sat aq soln contains 55.82% w/w at 28.5°. See Ewbank, Ewbank, *J. Chem. Soc.* 121, 1847, 1850 (1922).

The aq soln is neutral or slightly acid to litmus. *Keep well closed and protected from light.*

7656. **Potassium Selenate**.  $K_2O_4Se$ ; mol wt 221.15. K 33%, O 28.94%, Se 35.70%.  $K_2SeO_4$ . Colorless crystals or white powder. d 3.07. Sol in about 1 part water.

7657. *Reagent.*

7658. **Potassium Selenide**.  $K_2Se$ ; mol wt 157.15. K 50.71%, Se 50.24%. Prepa by heating selenium with an excess of potassium: Fones-Diacon, *Contribution à l'Etude des Métaux Métaux*, Montpellier (1901); by adding selenium to a soln of potassium in liq ammonia: Hugot, *Annales de Chimie et de Physique*, Paris (1900); Feher in *Handbook of Preparative Inorganic Chemistry*, vol. 1, G. Brauer, Ed. (Academic Press, New York, 2nd ed., 1963) p 119.

By igniting potassium selenite or selenate in an atm of oxygen: Berzilius, cited in *Mellor's* vol. 10, 167 (1930). Crystalline mass. d 2.29. Reddens on exposure to air. Very sol in water, insol in alcohol. Deliquescent. Forms potassium selenite with selenium acid. Forms potassium selenide with hydrogen selenide. Sol in water; insol in alcohol.

7659. **Potassium Silicate**. Soluble potash glass; soluble soda glass. Needle-like cryst. Freely sol in water.

$SiO_2$ ; may also contain water.

Colorless or yellowish, translucent to opalescent, glass-like pieces; strong alkaline, very slowly sol in cold water, or depend on, almost insol. More readily sol in with it under pressure. Insol in alcohol precipitation of silica. *Keep well closed.*

USE: As binder (e.g., in carbon electrodes); protective coatings; insol pigments; ceramics manuf.

7659. **Potassium Silver Cyanide**. *no-Clargentate(I-)*; *potassium dicyano-potassium cyanide*.  $C_2AgK_2N_2$ ; mol wt 194.21. Ag 34.21%, K 19.65%, N 14.08%. KA. White crystals; sensitive to light. *Poisonous* acids ppt silver cyanide from the soln. USE: In silver plating; as bactericide.

7660. **Potassium Sodium Tartrate**. *gnette salt*.  $C_4H_4KNaO_6$ ; mol wt 210.19%. K 18.60%, Na 10.94%, O 45.68%. Tetrahydrate, translucent crystals or cooling saline taste. Slightly effloresces mp 70-80°; at 100° loses 3H<sub>2</sub>O; becomes at 220° begins to dec. Sol in 0.9 part w alcohol. The aq soln is slightly alkaline. *Incompat:* Acids, calcium or lead salts silver nitrate.

USE: Manuf of mirrors; as a constituent for the control of radio frequencies, and the crystals are used.

THERAP CAT: Cathartic.

7661. **Potassium Sorbate**. 2,4-Hexa-um salt; *sorbic acid potassium salt*; *potassium sorbate*.  $C_8H_7KO_2$ ; mol wt 171.470%. K 26.03%, O 21.30%, CH<sub>3</sub> COOK. Prepa from sorbic acid and KOH. U.S. pat. 3,173,948 (1965 to Hoechst). Crystals, d<sub>4</sub><sup>25</sup> 1.363. Dec above 270°. 58.2% in alc; 3.6%.

USE: As mold and yeast inhibitor, where greater soly in water is desirable.

7662. **Potassium Stannate(IV)**.  $K_2SnO_4$ ; mol wt 319.37%. O 19.60%, Sn 48.47%. Trihydrate, colorless crystals. d 3.1 water; insol in alcohol. The aq soln is USE: In textile dyeing and printing, i

7663. **Potassium Stannosulfate**.  $MsSnS_2$ ; mol wt 389.02. K 20.10%, O 30.51%.  $K_2Sn(SO_4)_2$ . White crystals. Partly dec by water; hydrous solns.

7664. **Potassium Stearate**. *Stearic acid potassium salt*.  $C_{18}H_{35}KO_2$ . The article of considerable proportion of palmitate. White powder; usually with slight od in cold, readily in hot water or alcohol strongly alkaline to litmus or phenolphthalein soln is only slightly alkaline to p USE: In the manuf of textile softener

7665. **Potassium Sulfate**. *Sol pot-duplicate*; *tartarus vitriolatus*.  $K_2SO_4$ ; mol wt 174.26. O 36.73%, S 18.40%, K 30.51%. Colorless or white, odorless, hard, bi granules or powder; permanent in water, 4 One gram dissolves in 8.3 ml water, 4 ml glycerol; insol in alcohol. Its soly by KCl or (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> and is practical soln of the latter. The aq soln is n *Human Toxicity:* Swallowing large G.I. irritation.

USE: Technical grades are used in fe potassium alum, potassium carbonate; grade is used in the Kjeldahl determin

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